

**THAT WHICH IS CLAIMED IS:**

- 428<sup>2</sup>
1. An electrical memory device, said memory device comprising:
    - (a) a first electrode; and
    - (b) a storage medium electrically coupled to said electrode, said storage medium comprising an ionic liquid melt, said ionic liquid melt comprising at least a first redox active compound.
  2. The device according to claim 1, further comprising a second electrode electrically coupled to said storage medium.
  3. The device according to claim 1, wherein said storage medium is contained within an enclosed chamber.
  4. The device according to claim 1, wherein said storage medium is contained within a sealed chamber.
  5. The device according to claim 1, wherein said ionic liquid melt is a salt of an organic polymer ion and a polyether or polysiloxane counterion, said organic polymer ion selected from the group consisting of polypeptides, polynucleic acids, polystyrenes, and polysaccharides, and wherein at least one of said organic polymer ion and said counterion is redox active.
  6. The device according to claim 1, wherein said counterion comprises a polyether selected from the group consisting of polyethylene glycol and polypropylene glycol.
  7. The device according to claim 1, wherein said counterion comprises a polysiloxane.
  8. The device according to claim 1, said ionic liquid melt further comprising a second redox active compound that together with said first redox active compound form a redox active pair.

9. The device according to claim 8, wherein said device is a refreshable memory device.

10. The device according to claim 1, wherein said storage medium is not  
5 covalently bonded to said first electrode.

11. The device according to claim 10, said ionic liquid melt having a glass transition temperature between  $-50^{\circ}\text{C}$  and  $100^{\circ}\text{C}$ .

10 12. The device according to claim 11, wherein said ionic liquid melt is amorphous.

13. An electrical device comprising:

(a) a first electrode;

(b) a second electrode; and

(b) a medium electrically coupled to said first and second electrodes, said medium comprising an ionic liquid melt, said ionic liquid melt comprising at least a first redox active compound.

20 14. The device according to claim 13, further comprising a third electrode electrically coupled to said medium.

15. The device according to claim 13, wherein said medium is contained within an enclosed chamber.

25 16. The device according to claim 13, wherein said medium is contained within a sealed chamber.

17. The device according to claim 13, wherein said ionic liquid melt is a salt  
30 of an organic polymer ion and a polyether or polysiloxane counterion,

said organic polymer ion selected from the group consisting of polypeptides, polynucleic acids, polystyrenes, and polysaccharides,

and wherein at least one of said organic polymer ion and said counterion is redox active.

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18. The device according to claim 17, wherein said counterion comprises a polyether selected from the group consisting of polyethylene glycol and polypropylene glycol.

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19. The device according to claim 17, wherein said counterion comprises a polysiloxane.

20. The device according to claim 13, said ionic liquid melt further comprising a second redox active compound that together with said first redox active compound form a redox active pair.

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21. The device according to claim 20, wherein said device is a refreshable memory device.

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22. The device according to claim 13, wherein said medium is not covalently bonded to said first electrode.

23. The device according to claim 13, said ionic liquid melt having a glass transition temperature between  $-50^{\circ}\text{C}$  and  $100^{\circ}\text{C}$ .

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24. The device according to claim 23, wherein said ionic liquid melt is amorphous.

25. A polymer composition comprising a salt of an organic polymer ion and a polyether or polysiloxane counterion;

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said organic polymer ion selected from the group consisting of polypeptides, polynucleic acids, polystyrenes, glycoproteins, and polysaccharides;

wherein at least one of said organic polymer ion and said polyether counterion

is redox active;

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and wherein said composition is a melt.

26. A method of depositing a material on a substrate, comprising the step of:

coating at least one surface portion of a substrate with a composition according to claim 25.

27. The method according to Claim 26, wherein said substrate is selected from the group consisting of metals, semiconductors, and polymeric materials.

28. A structure, comprising:

- (a) a substrate; and  
(b) a coating on said substrate, said coating comprising a composition

according to claim 25.

29. The structure according to Claim 28, wherein the substrate is an electrode.

30. A method of forming a structure, comprising the steps of:

- (a) forming a molten salt of a composition according to claim 25; and  
(b) applying said molten salt to a substrate to form a structure.

31. The method according to Claim 30, wherein said substrate is an electrode.

32. A method of making a molten salt, said method comprising the steps of:

- (a) providing an organic polymer ion selected from the group consisting of polypeptides, polynucleic acids, polystyrenes, and polysaccharides;  
(b) providing a polyether counterion; and  
(c) combining said nucleic acid with said polyether counterion to make a

molten salt thereof in a molten phase.